WHAT IS CLAIMED IS:

1. In a hub configured for interconnection of a plurality of stations as part of a digital system such that digital data flows between the stations based on operational status of the system, the improvement comprising:

an arrangement forming part of the hub and connectable at points within the hub and between at least two different pairs of the stations for monitoring certain characteristics of said data in a way which provides for non-invasive identification of one or more conditions related to the operational status of the system.

2. The improvement according to Claim 1 wherein said arrangement monitors said certain characteristics of said digital data using ordered set detection.

3. The improvement according to Claim 2 wherein said arrangement is configured for detecting a group of ordered sets including the idle character, LIP, LIP F7, LIP F8, SOF, ARB and OPN.

4. The improvement according to Claim 2 wherein said arrangement includes a counter configured for counting the occurrence of a specified ordered set at any one of said points.

5. The improvement according to Claim 2 wherein said system is a Fibre Channel system and wherein said arrangement is configured for detection of any station transmitting a LIP F8 ordered set.

6. The improvement according to Claim 5 wherein said system is configured for bypassing each of said stations individually and wherein said arrangement initiates bypass of any station transmitting LIP F8.

7. The improvement according to Claim 1 wherein said data flows between the stations using a loop which interconnects the stations so as to define said points and wherein said arrangement includes means for generating certain ordered sets to be introduced to the loop.

8. The improvement according to Claim 7 wherein said certain ordered sets are configured for diagnostic purposes.

9. The improvement according to Claim 7 wherein said means for generating the certain ordered sets to be introduced to the loop is further configured for removing the certain ordered sets from the loop.

10. The improvement according to Claim 1 wherein said points are defined as part of a Fibre Channel loop extending between the stations on which operations are implemented using ordered sets and wherein said arrangement is configured for detecting a specific predetermined sequence of ordered sets which specific predetermined sequence is indicative of a series of operational states of the loop and for indicating a current one of the operational states of the loop.

11. The improvement according to Claim 10 wherein the current operational state is indicated on said hub.

12. The improvement according to Claim 10 wherein the series of operational states of the loop normally proceeds at startup or re-start from INOPERATIVE to INITIALIZING to OPEN-INIT to UP to UP+FRAME serving as said specific predetermined sequence of operational states.

13. The improvement according to Claim 12 wherein loop initialization is indicated by a LIP ordered set and wherein said INITIALIZING state is entered upon detecting the LIP F7 ordered set.

14. The improvement according to Claim 12 wherein said OPEN-INIT state is entered upon detecting a LIP ordered set followed by an ARB ordered set.

15. The improvement according to Claim 12 wherein said UP state is entered upon detecting a LIP ordered set followed by an ARB ordered set followed by a CLS ordered set.

16. The improvement according to Claim 12 wherein said UP+FRAME state is entered upon detecting a LIP ordered set followed by an ARB ordered set followed by a CLS ordered set followed by an SOF ordered set.

17. The improvement according to Claim 12 wherein said arrangement includes means for indicating that said loop is operational and wherein said loop is indicated as being operational in the UP and/or UP+FRAMES states.

18. The improvement according to Claim 1 wherein said data flows between the stations using a loop which interconnects the stations so as to define said points and said condition is a defect within the system and wherein said arrangement is configured for monitoring certain characteristics of said data at said points in a way which provides for non-invasive location of the defect.

19. The improvement according to Claim 1 wherein said data flows between the stations using a loop which interconnects the stations so as to define said points and wherein said arrangement is configured for connection to said points in a sequential manner such that only one of said points is monitored at a time.

20. The improvement according to Claim 19 wherein said arrangement alternates from one of said points to a next one of said points at a predetermined interval.

21. The improvement according to Claim 19 wherein said arrangement is configured for monitoring two or more of said points at a time.

22. The improvement according to Claim 1 wherein said data flows between the stations using a loop which interconnects the stations so as to define said points and wherein said hub is configured for interconnection of said stations using a series of ports, each one of said stations being physically receivable in one of the ports, said ports being interfaced with said loop such that, each station after initially having been received in one port, is insertable in the loop via by the port so as to cause said digital data to flow through the station and such that each one of the stations is selectively and individually bypassable with respect to the loop while the station is received in one of the ports to prevent said digital data from flowing through each of the stations and wherein said arrangement is configured for initially maintaining a connecting station, initially received in one of the ports and which may be defective, in a bypassed condition while verification of certain aspects of the operation of the station are performed such that insertion of the connecting station in the loop is prevented if the connecting station is defective.

23. The improvement according to Claim 22 wherein said arrangement verifies the operation of the connecting station by transmitting test data to the connecting station while bypassed and, thereafter, observes the response of the connecting station to the test data.

24. The improvement according to Claim 23 wherein the loop is a Fibre Channel loop and said arrangement transmits LIP F7 to the connecting station as test data while bypassed.

25. The improvement according to Claim 22 wherein said certain aspects of the operation of said stations include validation of data and loop attributes.

26. The improvement according to Claim 1 wherein said digital data flows between the stations using a main loop which interconnects the stations so as to define said points and wherein said arrangement includes analysis means for analyzing the digital data obtained at said points in order to establish those certain characteristics of interest.

27. The improvement according to Claim 26 wherein said analysis means includes means for verification of Fibre Channel compliance.

28. The improvement according to Claim 26 wherein said arrangement includes a diagnostics loop separate from the main loop and connected between the stations and with said analysis means, said diagnostics loop being configured for selectively copying the digital data from one of said points on the main loop at a time and, thereafter, for transmitting the copied digital data to said analysis means.

29. The improvement according to Claim 28 wherein said main loop carries the digital data in one direction between the stations and wherein the diagnostics loop carries the copied digital data in an opposing direction between the stations with respect to the digital data carried on the main loop.

30. The improvement according to Claim 28 wherein said analysis arrangement is configured for generating test data for testing a selected one of the stations such that the selected station, if operating properly, will respond in a predetermined way to the test data and said diagnostics loop is configured for carrying the test data to the selected one of the stations along one segment of the diagnostics loop extending from the analysis means to the selected station and for carrying the response of the selected station to the test data on another segment of the diagnostics loop extending from the selected station to the analysis means.

31. The improvement according to Claim 30 wherein the hub includes means for bypassing each of the stations with respect to the main loop and wherein said analysis arrangement cooperates with said diagnostics loop to transmit the test data to the selected station while the selected station is bypassed so as to observe the response of the selected station without affecting the operation of any stations continuing to use the main loop.

32. The improvement according to Claim 30 wherein said hub is configured for interconnection of said stations using a series of ports, said ports being interfaced with said loop such that each one of said stations is initially inserted into one of the ports and the inserted station is then selectively connectable with the loop using said bypass means to cause said digital data to flow through the inserted station with respect to the loop and selectively bypassable with respect to the loop to prevent said digital data from flowing through the inserted station and wherein said analysis arrangement cooperates with said diagnostics loop and said bypass means to initially hold an inserted station in a bypassed condition prior to connection with the loop until such time that the test data is transmitted to the inserted station and the predetermined response of the inserted station is observed by the analysis means via the diagnostics loop without affecting operation of other stations already using the main loop.

33. The improvement according to Claim 1 including beaconing means for providing a beacon indication in a way which identifies a location associated with a particular one of said conditions.

34. The improvement according to Claim 33 wherein said hub includes a series of ports such that each port connects one of the stations to the hub and, when said condition is a defect associated with a particular station, the location at which the beacon indication is provided is on said hub adjacent to the one of said ports to which the particular station is connected.

35. The improvement according to Claim 33 wherein said beacon indication is provided at a position remote from said hub.

36. The improvement according to Claim 1 wherein said hub is a Fibre Channel hub such that data frames pass through said hub, at least some of said data frames being subject to corruption within the system, and each data frame including a CRC for use in identifying corrupted data frames, and wherein said arrangement is configured for checking the CRC's of data frames passing through said points in a way which identifies corrupted ones of the data frames.

37. The improvement according to Claim 36 wherein said arrangement is configured for examining the CRC's of data frames at each of said points in a way which isolates the corrupted frames to origination at a certain one of said points.

38. The improvement according to Claim 36 wherein each data frame includes a source ALPA and wherein said arrangement is further configured for capturing the source ALPA of each of the corrupted ones of the data frames.

39. The improvement according to Claim 38 wherein said hub is configured for interconnection of said stations in a main loop using a series of ports such that one or more of said stations may be serially connected to each of the ports, with the station or stations connected to each of the ports of the hub forming a lobe of the main loop and wherein said arrangement uses the captured source ALPA's of corrupted ones of the data frames in a way which indicates a particular station which is serially connected with at least one other station in one lobe of the main loop as a probable cause of the corrupted data frames.

40. The improvement according to Claim 1 wherein said hub is a Fibre Channel hub such that said digital data passes through said hub, which digital data is subject to corruption within the system so as to violate a predefined transition density and wherein said arrangement is configured for identifying violations of the transition density by the digital data.

41. The improvement according to Claim 40 wherein an indication that the loop is down is provided upon identification of one or more violations of the transition density.

42. The improvement according to Claim 1 wherein said hub is a Fibre Channel hub such that said digital data is in the form of Fibre Channel characters which pass through said hub, at least some of said Fibre Channel characters being subject to invalidation within the system so as to violate predefined Fibre Channel protocol standards and wherein said arrangement is configured for identifying invalid ones of the Fibre Channel characters.

43. The improvement according to Claim 42 wherein said arrangement is configured for examining the Fibre Channel Characters at each of said points in a way which isolates the invalid Fibre Channel characters to origination at a certain one of said points.

44. The improvement according to Claim 43 wherein said hub is configured for interconnection of said stations in a main loop using a series of ports such that one or more of said stations may be serially connected to each of the ports, with the station or stations connected to each of the ports of the hub forming a lobe of the main loop and wherein said arrangement is further configured for providing an indication as to a defect associated with a particular lobe based on the invalid Fibre Channel characters detected.

45. The improvement according to Claim 44 wherein said indication is given in the form of a recommendation that the physical interconnection between the station on the particular lobe and the hub should be checked or replaced.

46. In a hub configured for interconnection of a plurality of stations using a loop as part of a digital system such that digital data flows between the stations on the loop under specific operational conditions, the improvement comprising the step of:

monitoring said digital data at a plurality of points distributed within the hub and between at least two different pairs of the stations for use in determining certain characteristics of said data in a way which provides for non-invasive identification of one or more conditions related to the operational status of the system.

47. The improvement according to Claim 46 wherein each station is identified by an ALPA as one of the certain data characteristics of interest and wherein at least a preliminary map of said digital system is established by monitoring the ALPA's present at one or more of said points.

48. The improvement according to Claim 47 wherein said ALPA's are examined at one of said points by using ARB commands issued by active ones of the stations such that the active stations are identified.

49. The improvement according to Claim 47 wherein said ALPA's are examined using OPN commands in which different open commands uniquely identify different ones of the stations in a way which serves to at least identify the destination of the data.

50. The improvement according to Claim 49 wherein the digital system is configured such that any one of the stations which receives its own ALPA as part of an OPN command on the loop will not retransmit the OPN command including its own ALPA and any one of the stations which receives an OPN command which does not include its ALPA will retransmit the OPN command on the loop and wherein said preliminary map is established at least in part by observing for response of the stations to which the different OPN commands are directed.

51. In a digital system including a loop configured for interconnection of a plurality of stations as part of the digital system such that digital data is transmitted between the stations on the loop under particular operational conditions and in which system the stations pass idle characters between one another on the loop at times when said digital data is not being transmitted, the improvement comprising:

an arrangement for monitoring certain characteristics of said idle characters in a way which provides for detecting one or more conditions related to the operational status of one or more of the stations.

52. The improvement according to Claim 51 wherein said arrangement monitors points on said loop between at least two different pairs of said stations.

53. The improvement according to Claim 52 wherein said arrangement compares the idle characters on said loop present between the two different pairs of stations to a standard idle character format in order to identify corrupted ones of the idle characters.

54. The improvement according to Claim 53 wherein the points are selected so as to establish a particular one of said stations originating the corrupted ones of the idle characters.

55. The improvement according to Claim 54 further comprising means for generating a notification that said particular station is defective.

56. The improvement according to Claim 54 further comprising means for removing said particular station from the loop such that subsequent digital data to be transmitted on the loop is not lost due to the particular station.

57. The improvement according to Claim 56 wherein said arrangement is configured for continuing to monitor said points to verify integrity of the idle characters following the removal of the particular station from the loop.

58. In a Fibre Channel system configured for interconnection of a plurality of stations as part of a digital system using a main loop such that digital data flows between the stations on the main loop through a Fibre Channel hub based on operational status of the system, said Fibre Channel hub being configured for interconnection of said stations using a series of ports which interface with said main loop, each station being removably receivable in one of said ports such that each one of said stations is selectively insertable in the main loop via the ports to cause said digital data to flow through the stations and such that each one of the stations is selectively and individually bypassable with respect to the main loop while the station is received in one of the ports to prevent said digital data from flowing through each of the stations, the improvement comprising:

an arrangement forming part of the hub and part of at least one selected station configured for sending a set of loop-back test data from the selected station to the hub when the selected station is received in one of the ports and, thereafter, looping the set of loop-back test data back to the selected station in a loop-back mode in a way which confirms operation of the selected station using the port into which the selected station is received and which also confirms the operation of at least a portion of said hub.

59. The arrangement according to Claim 58 further configured for entering said loop-back mode at least after a new station has been initially received in one of said ports.

60. The arrangement according to Claim 58 further configured to operate in said loop-back mode using diagnostic means connectable at points within the hub and between at least two different pairs of the stations for monitoring certain characteristics of said set of loop-back data in a way which provides for non-invasive confirmation of the operation of said portion of the hub and of the operation of the port into which the selected station is received.

61. The arrangement according to Claim 60 wherein said diagnostic means includes a diagnostics loop separate from the main loop and connected between the stations and further includes analysis means, said

diagnostics loop being configured for selectively copying the set of loop-back data from one of said points on the main loop at a time and, thereafter, for transmitting the copied digital data to said analysis means.

62. The arrangement according to Claim 58 wherein said arrangement is configured for initially maintaining a received station in a bypassed condition with respect to said main loop during said loop-back mode while verification of certain aspects of the operation of the inserted station is performed whereby connection of a defective received station with the main loop is prevented.

63. In a Fibre Channel system configured for interconnection of a plurality of stations as part of a digital system using a main loop such that digital data flows between the stations on the main loop through a Fibre Channel hub, said Fibre Channel hub being configured for interconnection of said stations using a series of ports interfaced with said main loop, each station being removably receivable in a respective one of said ports such that each one of said stations is selectively insertable in the main loop when received in one of the ports to cause said digital data to flow through the stations, a method of inserting a selected station in the main loop, said method comprising the steps of:

a) positioning the selected station as being received in an available one of the ports;

b) maintaining the selected station disconnected from the main loop;

c) while the selected station is disconnected from the main loop, performing an external loop-back test which verifies integrity of the selected station; and

d) connecting the selected station to the main loop only after the integrity of the selected station has been verified using the external loop-back test.

64. The method according to Claim 63 including the step of providing a notification in a predetermined way if the selected station is not connected to the main loop within a specified period of time following insertion of the selected station into the available port.

65. The method according to Claim 64 wherein said notification is provided at a remote location with respect to said Fibre Channel hub.

66. In a Fibre Channel system including a plurality of stations interconnected through a hub to form a main loop such that each station, including its connection to the hub, forms a lobe of the main loop and such that digital loop data normally flows between the stations on the main loop, a method of verifying the integrity of a selected one of said lobes using said hub, said method comprising the steps of:

a) establishing digital test data designed to illicit a predetermined response if received by the station connected to the selected lobe;

b) if said digital loop data is flowing through the selected lobe, isolating the selected lobe from the main loop such that the digital loop data continues to flow on the main loop;

c) transmitting the digital test data from the hub such that the digital test data is placed enroute to the station connected to the selected lobe;

d) thereafter, in the hub, listening on the selected lobe for said predetermined response from the station on the selected lobe; and

e) providing an indication as to the integrity of the selected lobe based upon detection of the predetermined response from the station on the selected lobe.

67. The method according to Claim 66 wherein the digital test data illicits the predetermined response of the station in the form of a copy of the digital test data.

68. The method according to Claim 66 wherein the station on the selected lobe includes a loop state machine and wherein the digital test data is an ordered set which should illicit a different response from the loop state machine as the predetermined response of the station on the selected lobe such that the integrity of the loop state machine is confirmed.

69. The method according to Claim 68 wherein said different response is a particular ordered set.

70. In a Fibre Channel system configured for interconnection of a plurality of stations as part of a digital system using a main loop such that digital data flows between the stations on the main loop through a hub, said hub being configured for interconnection of said stations using a series of ports interfaced with said main loop, each port including a hub transmitter for sending the digital data from the hub to the station connected with that port and each station, including its connection to the hub, forming a lobe of the main loop, a method of verifying the integrity of a selected one of said lobes using said hub, said method comprising the steps of:

a) bypassing the selected lobe with respect to the main loop;

b) configuring each hub transmitter such that receipt of a disable signal causes one of the hub transmitters receiving the disable signal to stop sending the digital data to the station connected with the selected lobe;

c) sending the disable signal to the hub transmitter which transmits said digital data to the station connected to the selected lobe;

d) thereafter, in the hub, listening on the selected lobe for a predetermined response from the station on the selected lobe; and

e) providing an indication as to the integrity of the selected lobe based upon detection of the predetermined response from the station on the selected lobe.

71. The method according to Claim 70 wherein said system is a Fibre Channel system and wherein the hub listens for a LIP F8 ordered set as said predetermined response.

72. In a Fibre channel system configured for interconnection of a plurality of stations using a loop as part of a digital system such that digital data flows including ordered sets flows between the stations on the loop based on operational status of the system, said stations being interconnected by a hub which partially defines said loop, a management arrangement comprising:

a) monitoring means forming one part of said hub for non-invasively monitoring a plurality of points distributed on said loop between pairs of said stations that are adjacent to one another with respect to said loop for the presence at said points of one of a number of predetermined types of ordered sets, which predetermined ordered set types are indicative of the operational status of the stations and of the hub; and

b) analysis means forming another part of said hub for establishing at least one status indication based on the presence of said predetermined ordered set types at one or more of said points.

73. The management arrangement according to Claim 72 wherein said status indication is selected from an array of loop states ranging from non-operational to fully operational and said management arrangement includes control means for responding to said status indication in a way which alters the overall configuration of the

loop to move the operational status of the system more toward fully operational when the status indication is within a predetermined range from non-operational in said array of loop states.

74. The management arrangement according to Claim 72 wherein said status indication is an overall health indication of the condition of said loop based upon the predetermined ordered set type that is present at each of said points.

75. The management arrangement according to Claim 72 wherein the status indication is selected from a group of loop states including INOPERATIVE, INITIALIZING, OPEN-INIT, UP and UP+FRAME.

76. The management arrangement according to Claim 75 including display means wherein said loop is represented visually in at least one view as an icon on said display means and wherein said icon includes one of a number of different colors which denote said status indication.

77. The management arrangement according to Claim 76 wherein each station is physically connected to one of a number of ports, respectively, on said hub and wherein said analysis means is configured for generating additional status indications such that each port has an associated additional status indication and said display means is further configured such that selection of said icon leads to a hub view which is physically representative of said hub including said ports and said display means uses said different colors in association with said ports in a way which indicates the additional status indication associated with each port.

78. The management arrangement according to Claim 77 wherein selection of one of said ports as represented on said display means leads to an additional view on the display means which includes specific information related to the selected port and to any station connected with the selected port.

79. The management arrangement according to Claim 78 including control means forming part of said hub and having a series of user selectable port control modes such that any port may be placed in one of the control modes and wherein said specific information includes an indication of the port control mode currently selected for the selected port.

80. The management arrangement according to Claim 79 wherein said stations are selectively connectable with said loop using said port control modes and wherein said port control modes include an automatic mode in which each station is connected to the loop based on certain criteria.

81. The management arrangement according to Claim 79 wherein said stations are selectively connectable with said loop using said port control modes and wherein said port control modes include a forced bypass mode in which any station inserted into any port in forced bypass mode is disconnected from the loop.

82. The management arrangement according to Claim 79 wherein said stations are selectively connectable with said loop using said port control modes and wherein said port control modes include a loop-back mode such that digital data transmitted from a particular station connected to a port in loop-back mode is returned to that particular station without being transmitted to other stations on the loop.

83. The management arrangement according to Claim 79 wherein said stations are selectively connectable with said loop using said port control modes and wherein said port control modes include a forced insert mode such that a particular station connected to a port in forced insert mode is always connected to the loop.

84. The management arrangement according to Claim 79 wherein each station is connected to a respective one of the ports using a gigabit interface converter (GBIC) inserted into the port, each GBIC being selected from one of a number of possible GBIC types and each GBIC including readable information identifying its type out of the number of possible GBIC types and wherein the management arrangement includes means for reading the readable information from the GBIC and for providing said readable information as part of said specific information.

85. The management arrangement according to Claim 77 including control means forming part of said hub and configured such that any port may be beaconed in a predetermined way and wherein selection of one of said ports as represented on said display means leads to a port view on the display means which includes means for causing the selected port to be beaconed.

86. The management arrangement according to Claim 85 wherein said additional view includes a beacon port selection box for causing the selected port to be beaconed.

87. The management arrangement according to Claim 85 wherein said beaconing of the selected port is visible in the hub view in a way which directs a viewer's attention to the selected port.

88. The management arrangement according to Claim 85 wherein the selected port is beaconed in said predetermined way using beaconing means located physically adjacent to the selected port on said hub.

89. The management arrangement according to Claim 85 wherein said beaconing means includes a light emitting arrangement adjacent to the selected port on said hub which flashes at a selected interval when the selected port is beaconed.

90. The management arrangement according to Claim 72 further comprising:

c) display means for simultaneously displaying the predetermined ordered set type which is present at each one of said points so as to enable an operator of the system to make determinations as to an individual status of each one of the stations.

91. The management arrangement according to Claim 90 wherein the predetermined ordered set types include LIP, LIP F7, LIP F8, OPN, ARB, SOF, USR and IDLE.

92. In a Fibre channel system configured for interconnection of a plurality of stations using a loop as part of a digital system such that digital data including ordered sets flows between the stations on the loop based on operational status of the system, said stations being interconnected by a hub which partially defines said loop, a method comprising the steps of:

a) non-invasively monitoring a plurality of points distributed on said loop between pairs of said stations that are adjacent to one another with respect to said loop for the presence of one of a number of predetermined types of ordered sets, which predetermined ordered set types are indicative of the operational status of the stations and of the loop; and

b) establishing at least one status indication based on the presence of said predetermined ordered set types at one or more of said points.

93. The method according to Claim 92 wherein said status indication is selected from an array of loop states ranging from non-operational to fully operational and said method includes the step of responding to said

status indication in a way which alters the overall configuration of the loop to move the operational status of the system more toward fully operational when the status indication is within a predetermined range from non-operational in said array of loop states.

94. The method according to Claim 92 wherein said status indication is an overall health indication of the condition of said loop based upon the predetermined ordered set type that is present at each of said points.

95. The method according to Claim 94 wherein the status indication is selected from a group of loop states including INOPERATIVE, INITIALIZING, OPEN-INIT, UP and UP+FRAME.

96. The method according to Claim 92 including the step of visually displaying said loop as an icon including one of a number of different colors which denote said status indication.

97. The method according to Claim 92 including the step of simultaneously displaying the predetermined ordered set type which is present at each one of said points so as to enable an operator of the system to make determinations as to an individual status of each one of the stations.

98. In a Fibre Channel system which interconnects a plurality of stations in a loop using an unmanaged hub as part of a digital system such that digital data flows between the stations on the loop and through the unmanaged hub based on operational status of the system, the system further including an additional hub connected with the unmanaged hub in a predetermined way such that additional stations may be added to the loop by connection with the additional hub and so that said digital data also flows through the additional hub, the improvement comprising:

a management arrangement forming part of the additional hub for monitoring said digital data in a way which provides determinations as to certain conditions related to the operation of the Fibre Channel system including the unmanaged hub and stations connected thereto.

99. The improvement according to Claim 98 wherein said determinations relate to utilization of at least a portion of the main loop.

100. The improvement according to Claim 99 wherein the portion of the main loop to which said determinations relate is at least partially extends through the unmanaged hub.

101. The improvement according to Claim 99 wherein said arrangement is configured for generating display information based on said determinations.

102. The improvement according to Claim 98 wherein said arrangement uses ordered set detection in making said determinations.

103. In a Fibre Channel system which interconnects a plurality of stations in a loop using two or more hubs as part of a digital system such that digital data flows between the stations on the loop and through the hubs based on operational status of the system, the improvement comprising:

an arrangement forming part of each hub configured such that each hub identifies itself in the digital system in a way which provides for correctly establishing a system configuration of the interconnection between all of the hubs within the digital system.

104. The improvement according to Claim 103 wherein an additional hub is added, including said arrangement forming a portion thereof, and wherein the arrangement forming the portion of the additional hub identifies itself after being added to the digital system such that an updated system configuration of the interconnection between all of the hubs is established, said updated system configuration including the additional hub.

105. The improvement according to Claim 103 including management means configured for receiving and tracking the identification issued by each of the hubs.

106. The improvement according to Claim 105 wherein said management means includes means for identifying the stations connected to the hubs and for adding the stations to the system configuration in relation to the hubs.

107. The improvement according to Claim 106 wherein said management means includes means for producing a map of the system configuration.

108. In a Fibre Channel system configured for interconnection of a plurality of stations as part of a digital system using a main loop such that digital data flows between the stations on the main loop through a hub, said hub being configured for interconnection of said stations using a series of ports interfaced with said main loop such that one or more stations are connected to each port to form a lobe of the main loop, a method of verifying the integrity of a selected one of said lobes including the station or stations in the selected lobe, said method comprising the steps of:

a) configuring said hub for entering a lobe test mode such that any digital data transmitted to the hub from the station or stations on the selected lobe in the lobe test mode is returned to the selected lobe;

b) placing the selected lobe into the lobe test mode while digital data present on the main loop continues to flow thereon; and

c) thereafter, in the hub, listening on the selected lobe for a predetermined initialization sequence on the selected lobe without affecting digital data flowing on the main loop.

109. The method according to Claim 108 further comprising the step of:

d) providing an indication as to the integrity of the selected lobe based upon detection of the predetermined initialization sequence on the selected lobe.

110. The method according to Claim 109 wherein the selected initialization sequence is detected by the sequence of ordered sets including LIP, ARB, CLS and SOF.

111. In a Fibre Channel hub configured for interconnection of a plurality of stations as part of a digital system such that data frames pass through said hub, at least some of said data frames being subject to corruption within the system, and each data frame including a CRC for use in identifying corrupted data frames, the improvement comprising:

an arrangement forming part of the hub configured for checking the CRC's of data frames passing through the hub in a way which identifies corrupted ones of the data frames.

112. The improvement according to Claim 111 wherein each data frame includes a source ALPA and wherein said arrangement is further configured for capturing the source ALPA of each of the corrupted ones of the data frames.

113. The improvement according to Claim 112 wherein said hub is configured for interconnection of said stations in a main loop using a series of ports such that one or more of said stations may be serially connected to each of the ports, with the station or stations serially connected to each of the ports of the hub forming a lobe of the main loop and wherein said arrangement uses the captured source ALPA's of corrupted ones of the data frames in a way which identifies a particular station which is serially connected with at least one other station in one lobe of the main loop as a probable cause of the corrupted data frames.

114. The improvement according to Claim 111 wherein occurrences of corrupted data frames identified by said arrangement are collected by the arrangement for display in a persistent mode.

115. In a Fibre Channel hub configured for interconnection of a plurality of stations as part of a digital system such that digital data in the form of Fibre Channel characters passes through said hub, at least some of said Fibre Channel characters being subject to corruption within the system so as to violate predefined Fibre Channel protocol standards, the improvement comprising:

an arrangement forming part of the hub configured for identifying invalid ones of the Fibre Channel characters.

116. The improvement according to Claim 115 wherein said hub is configured for interconnection of said stations in a main loop using a series of ports such that one or more of said stations may be serially connected to each of the ports, with the station or stations connected to each of the ports of the hub forming a lobe of the main loop and wherein said arrangement is configured for isolating the invalid Fibre channel characters to a particular lobe.

117. The improvement according to Claim 116 wherein said arrangement is configured for providing an indication based on said invalid Fibre Channel Characters that the particular lobe should be checked.

118. The improvement according to Claim 115 wherein occurrences of invalid Fibre Channel characters identified by said arrangement are collected by the arrangement for display in a persistent mode.

119. In a Fibre Channel system which interconnects a plurality of stations in a loop using at least a first hub as part of a digital system such that digital data flows between the stations on the loop and through the hub or hubs based on operational status of the system, each station being configured such that, upon receipt of a LIP F7 ordered set, the station will transmit a burst of LIP F7 followed by 15 ms of idle characters, a method of identifying an unknown hub requesting insertion in the loop, said method comprising the steps of:

a) transmitting one burst of LIP F7 from the first hub to the unknown hub;

b) within 15 ms of ending transmission of the LIP F7 burst, transmitting on the loop an ARB FB from said first hub;

c) if the ARB FB returns to the first hub, requesting identification information from the unknown hub using said loop; and

d) if the unknown hub responds to the information identification request, using the first hub to receive a predetermined set of identification information from the unknown hub.

120. The method according to Claim 119 wherein said step of requesting identification from the unknown hub is performed using ordered sets prior to insertion of the unknown hub.

121. The method according to Claim 119 wherein said identification information is a serial number assigned to the unknown hub.

122. In a Fibre Channel system which interconnects a plurality of stations in a loop using at least a first hub as part of a digital system such that digital data flows between the stations on the loop and through the hub or hubs based on operational status of the system, each station being configured such that, upon receipt of LIP F7, the station will transmit a burst of LIP F7 followed by 15 ms of idle characters, a method of identifying an unknown station requesting attachment to the loop, said method comprising the steps of:

a) transmitting one burst of LIP F7 from the first hub to the additional hub;

b) within 15 ms of ending transmission of the LIP F7 burst, transmitting on the loop an ARB FB from said first station; and

c) if the ARB FB does not return to the first station, providing an indication that the unknown station is an attaching station.

123. In a Fibre Channel system including at least a first loop and a second loop in which the first and second loops are at least initially operating separately from one another such that different digital data flows around each loop and each loop includes one or more stations attached thereto having an ALPA assigned to each station such that the ALPA's assigned to the stations on the first loop are not necessarily unique with respect to the ALPA's of the stations on the second loop, a method of interconnecting the first loop to the second loop to form a single loop, said method comprising the steps of:

a) establishing loop input and loop output connection points defined by the first and second loops at which the loops are to be connected with one another such that the loop input connection point of each loop is connected to the loop output connection point of the other loop;

b) transmitting initialization data from the loop output connection point of the second loop to the loop input connection point of the first loop;

c) listening at the loop input connection point of the second loop to establish that the initialization data has passed through the first loop and returned to the loop input connection point of the second loop;

d) transmitting additional initialization data such that the additional initialization data travels around the first loop and the second loop in a predetermined way which initializes both loops and causes a unique ALPA to be assigned to the stations attached to each loop; and

e) connecting the first and second loop as said single loop to permit a combination of the digital data previously flowing on the first and second loops to flow around the single loop.

124. The method according to Claim 123 wherein said initialization data and said additional initialization data each include LIP F7 ordered sets.

125. The method according to Claim 123 wherein the additional initialization data is transmitted in said predetermined way such that the first loop is reinitialized prior to the second loop being reinitialized.

126. The method according to Claim 123 wherein the additional initialization data is transmitted in said predetermined way such that the second loop is reinitialized prior to the first loop being reinitialized.